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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,621	04/16/2004	Robert C. Schucker	18056/100792-02	1308

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EXAMINER

SINGH, PREM C

ART UNIT

PAPER NUMBER

1764

DATE MAILED: 07/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/826,621

Applicant(s)

SCHUCKER, ROBERT C.

Examiner

Prem C. Singh

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 April 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 05/17/2004
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 12, 17, 18, and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 recites the limitation "said molar ratio (misspelled as "ration") of sodium to sulfur" in claim 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 17 recites the limitation "said first temperature" in claim 14. There is insufficient antecedent basis for this limitation in the claim.

Claim 18 recites the limitation "said first temperature" in claim 14. There is insufficient antecedent basis for this limitation in the claim.

Claim 22 recites the limitation "said molar ratio (misspelled as "ration") of sodium to sulfur" in claim 14. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baird, Jr. et al (US Patent 4,017,381).

Claims 1, 13, 14, and 23.

Baird discloses, "A sulfur-containing feedstock preheated to 450-500°F is fed by means of line (1). The reactor contains baffles (19) to promote continuing contact between sodamide and the oil. Hydrogen is introduced to the reactor vessel (18) via line (74) in amounts such that the total partial pressure of hydrogen in the reactor ranges between about 500 and 3000 psig. Holding time in the reactor is about 15 to 60

Art Unit: 1764

minutes. The desulfurized feedstock containing dispersed sodium sulfide and other salts leaves the top of reactor (18) via line (21). The dispersion exits through line (21) at about 800°F and 1500 psig and is then passed to ammonia purge vessel (22) where the pressure is lowered to 50-300 psig. The hydrogen is separated from ammonia by conventional techniques and may be returned to the reactor vessel (18) while the ammonia may be employed to form sodamide. Sodium sulfide-oil dispersion exiting vessel (22) via line (25) to heat exchanger (75) where the temperature is adjusted to 650-750°F and is introduced into contacting vessel (26) via line (76) wherein the dispersion is contacted with 110 to 400 mole % hydrogen sulfide thereby converting sodium sulfide to sodium hydrosulfide. Desulfurized oil is withdrawn via line (33)."

Column 7, lines 3-68; column 8, lines 1-20).

Baird further discloses, " During cell operation, sodium ions migrate through a membrane to the iron gauze where electron transfer and reaction with ammonia occurs to form sodamide." (Column 9, lines 56-59).

It is to be noted that Baird is not using sodium and shows that sodium and ammonia react to form sodamide. Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Baird invention and use a solution of sodium and ammonia instead of using sodamide because a solution of sodium in ammonia is similar to sodamide. Therefore, sodamide would have an equivalent function as a solution of sodium in ammonia.

Art Unit: 1764

Claim 2.

Baird discloses, "The temperature at the top of reactor (18) is about 820°F but can range as high as 900°F." (Column 7, lines 36-38). "Sodium sulfide-oil dispersion exiting vessel (22) via line (25) to heat exchanger (75) where the temperature is adjusted to 650-750°F. " (Column 7, lines 56-58).

Claims 3 and 15.

Baird discloses a liquid hydrocarbon product starting with atmospheric residuum and desulfurized by adding sodamide as shown in Table I.

Claims 4 and 16.

Baird uses sodamide and not ammonia and sodium separately, but it would have been obvious to one skilled in the art to use anhydrous ammonia as the solvent because it will give the same result after mixing with sodium as sodamide.

Claims 5, 6, 17, and 18.

Baird discloses, "The feedstock, sodamide, and hydrogen may be contacted at a temperature within the range of from about 400°F to about 750°F." (Column 4, lines 2-5).

Since, Baird is using higher temperatures, it would have been obvious to one skilled in the art at the time the invention was made to modify Baird invention and use a lower temperature as claimed for a better controlled and safer desulfurization reaction.

Art Unit: 1764

Claims 7 and 19.

Baird discloses, "Holding time in the reactor is about 15 to 60 minutes." (Column 7, lines 35-36).

Claims 8, 9, and 20.

Baird discloses, "The feedstock, sodamide, and hydrogen may be contacted at a temperature within the range of from about 400°F to about 750°F." (Column 4, lines 2-5).

Claims 10, 11, and 21.

Baird discloses that sodium sulfide is contacted with hydrogen sulfide, thereby converting sodium sulfide to sodium hydrosulfide. The mixture is fed through line (30) to hydrocyclone vessels where sodium hydrosulfide is disengaged. (Column 7, lines 56-68; column 8, lines 3-7). Baird further discloses, "Sodamide is regenerated from the sodium sulfur salts produced in the desulfurization step wherein the sodium salts are converted to sodium polysulfide which undergoes electrolysis in the presence of ammonia."

Although Baird is using hydrogen sulfide to recover sodium sulfide by converting it to sodium polysulfide, and it is clear that polysulfides are electrolyzed in presence of ammonia (See reactions, column 4 lines 60-63; column 5, lines 5-6), which shows that ammonia is being used to react with polysulfides, thus it would have been obvious to

Art Unit: 1764

one skilled in the art at the time the invention was made to modify Baird process and use ammonia as the agent for extracting sodium sulfide.

Claims 12 and 22.

Baird discloses, "From about 1 to about 10 moles of sodamide per mole of sulfur in the feedstock can be employed." (Column 3, lines 18-22).

Although Baird uses the ratio of sodamide to sulfur, it would have been obvious to one skilled in the art at the time the invention was made to modify Baird invention and use a ratio of sodium to sulfur, because both will yield similar information on the required amount of desulfurizing agent for proper sulfur removal from the hydrocarbon.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

McCullough et al, US Patent 2,309,651.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prem C. Singh whose telephone number is 571-272-6381. The examiner can normally be reached on MF 6:30 AM-3:00 PM.



Art Unit: 1764

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ps/062806

A handwritten signature in black ink, appearing to be "Zam", with a horizontal line underneath it.